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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.             | CONFIRMATION NO. |
|---|-------------|----------------------|---------------------------------|------------------|
| 10/765,046  | 01/28/2004  | Hiroaki Inoue        | 2004-0128                       | 9607             |
| 513   | 7590        | 11/03/2004           |                                 |                  |
| WENDEROTH, LIND & PONACK, L.L.P.<br>2033 K STREET N. W.<br>SUITE 800<br>WASHINGTON, DC 20006-1021 |             |                      | EXAMINER<br>KLEMANSKI, HELENE G |                  |
|   |             |                      | ART UNIT<br>1755                | PAPER NUMBER     |

DATE MAILED: 11/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/765,046

Applicant(s)

INOUE ET AL.

Examiner

Helene Klemanski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5 and 12-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 12-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/994,834.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/28/04</u> . | 6) <input type="checkbox"/> Other: ____  |

## **DETAILED ACTION**

### ***Drawings***

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: #53 in Fig. 14; #521, #523, #530 and #540 in Fig. 16; #609-1 in Fig. 18; #106 and #771 in Fig. 20; #23 in Fig. 23; #813 in Fig. 25; #820 and #146 in Fig. 26 and #816 and #226 in Fig. 27. Correction is required.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: #550 and #551 in Fig. 14; #521 and #523 in Fig. 15; #552, #553 and #554 in Fig. 16; #601-2 in Fig. 18; #710-3, #711-3 and #726 in Fig. 24; #820a, #820b and #131 in Fig. 25 and #821 and #846 in Fig. 26. Correction is required.

### ***Specification***

3. The disclosure is objected to because of the following informalities: on page 1 of the specification, the divisional application information needs to be updated (i.e. the Patent No. inserted); on page 4, line 18, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on page 4, line 20, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on page 4, line 23, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on page 5, line 4, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on page 6, line 10, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on

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page 11, line 25, the term "ammoniums" should be replaced with the phrase "ammonium ions"; on page 24, line 20, the term "ammoniums" should be replaced with the phrase "ammonium ions" and on page 24, line 28, the term "ammoniums" should be replaced with the phrase "ammonium ions".

Appropriate correction is required.

### ***Claim Objections***

4. Claims 1 and 3 are objected to because of the following informalities: in claim 1, line 5, the term "ammoniums" should be replaced with the phrase "ammonium ions" and in claim 3, line 2, the term "ammoniums" should be replaced with the phrase "ammonium ions". Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Inoue et al. ('838).

Inoue et al. ('838) teach an electroless plating bath having a pH from 6-9 useful for plating a semiconductor comprising nickel ions, a chelating agent such as ammonia (i.e. source of ammonium ions), carboxylic acids and mixtures thereof, a reducing agent such as sodium borohydride and dimethylamineborane, a soluble salt of a condensate of an arylsulfonic acid with formalin, and glycolic acid. The plating bath is used to plate a substrate by immersing the substrate in the bath at a temperature of 50 to 90°C. The coating film thickness is usually 5-200 microns. See col. 2, lines 5-9, col. 3, lines 21-63, col. 4, lines 42-43 and lines 60-63, vol. 5, line 2, examples 1 and 3, Tables 1, 2 and 4 and claims 1-3. The electroless plating bath as taught by Inoue et al. ('838) appears to anticipate the present claims.

7. Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Feldstein ('126).

Feldstein ('126) teaches an aqueous alkaline electroless bath composition comprising nickel ions, a pyrophosphate complexing agent, a substitute amine borane reducing agent and ammonium hydroxide (i.e. source of ammonium ions). The plating bath is used to plate a substrate by immersing the substrate in the bath at a temperature of 40°C or higher. See col. 1, line 68 – col. 2, line 5, the Table and claim 1. The aqueous alkaline electroless bath as taught by Feldstein ('126) appears to anticipate the present claims.

The preamble limitation "for forming a Ni-B alloy film on at least part of interconnects of an electronic device having an embedded interconnect structure" is of no consequence when a composition is the same. Ultimate intended utility does not make a composition patentable. See *In re Pearson*, 181 U.S.P.Q. 6411.

8. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by Itoh et al. ('745).

Itoh et al. ('745) teach an electroless plating bath having a pH of 4-14 comprising nickel ions, a reducing agent such as sodium borohydride or alkylamineboranes, a complexing agent such as glycine, a sulfur containing compound and zinc ions. The plating bath can also contain a nitrogenous compound such as ammonia and the pH can be adjusted by adding aqueous ammonia. The plating bath is used to plate a substrate by immersing the substrate in the bath at a temperature of 60 to 95°C. See col. 2, lines 13-55, col. 3, lines 49-60, col. 4, lines 9-39, col. 5, lines 20-23 and line 37, example 3 and claims 1, 2, 5 and 6. The electroless plating bath as taught by Itoh et al. ('745) appears to anticipate the present claims.

The preamble limitation "for forming a Ni-B alloy film on at least part of interconnects of an electronic device having an embedded interconnect structure" is of no consequence when a composition is the same. Ultimate intended utility does not make a composition patentable. See *In re Pearson*, 181 U.S.P.Q. 6411.

9. Claims 1, 2, 4, 5, 12, 13, 15 and 16 are rejected under 35 U.S.C. 102(e) as being anticipated by Inoue et al. (US 2003/0019426).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Inoue et al. teach an electroless plating bath having a pH of from 5-12 comprising nickel ions, a reducing agent such as sodium borohydride, a complexing agent and a pH buffer such as tetramethyl ammonium hydroxide (i.e. source of ammonium ions). The plating bath is used to plate a substrate by immersing the substrate in the bath at a temperature of 60 to 90°C. The nickel plating may be applied to form a protective film on the surface of an interconnect to a thickness of 0.1-500 nm. See para. 0057, para. 0062, paras. 0066 and 0067, paras. 0099-0100, para. 0103 and para. 0121. The electroless plating bath as taught by Inoue et al. appears to anticipate the present claims.

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 12-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Inoue et al. ('838).

Inoue et al. ('838) is cited and relied upon for the above stated reasons. Inoue et al. ('838) fails to teach coating the electroless plating composition on at least part of interconnects of an electronic device having an embedded interconnect structure.

Therefore, it would have been obvious to one having ordinary skill in the art to have coated the plating composition onto an interconnect structure since a semiconductor device is an electronic device with embedded interconnects.

### ***Conclusion***

The remaining references listed on forms 892 and 1449 have been reviewed by the examiner and are considered to be cumulative to or less material than the prior art references relied upon in the above rejections.

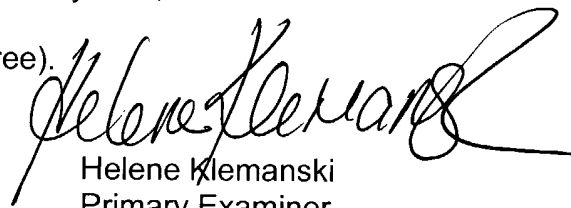
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Helene Klemanski whose telephone number is (571) 272-1370. The examiner can normally be reached on Monday-Friday 5:30-2:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Bell can be reached on (571) 272-1362. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Helene Klemanski  
Primary Examiner  
Art Unit 1755



HK  
November 1, 2004